REMOVAL OF REACTIVE RED 198 DYE FROM AQUEOUS SOLUTION BY ACTIVATED OIL PALM KERNEL SHELL

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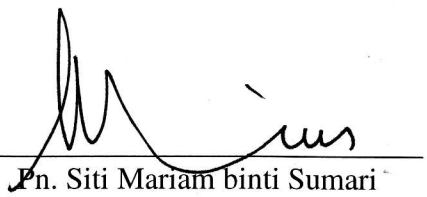

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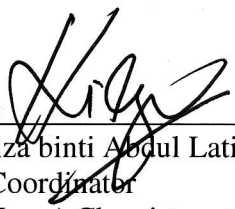

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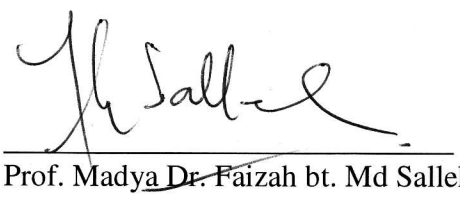

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ABSTRACT

REMOVAL OF REACTIVE RED 198 DYE FROM AQUEOUS SOLUTION BY ACTIVATED OIL PALM KERNEL SHELL

The adsorption behavior of Reactive Red 198 (RR198) from the aqueous solution onto activated palm kernel shell (APKS) was investigated under several different operating parameters (contact time, adsorbent dosage, pH, particle size, initial dye concentration and temperature). APKS was shown to be effective in removing reactive dye. At temperature 25, 30 and 35°C percent of removal of RR198 was increased respectively. Meanwhile, at pH 4, 7, 9 and 11, percent of removal of RR198 was decreased respectively. These indicated that the process is endothermic reaction and the anionic species of RR198. On the other hand, the adsorbent was characterized under several methods which are ash content, apparent density, SEM, and FTIR. From the results, the percent of ash content in activated palm kernel shell (APKS) is lower than commercial activated carbon (CAC) which indicated APKS is more pure than CAC. Adsorption isotherms used in this experiment are Langmuir and Freundlich isotherm. Both of these isotherms were described the RR198 adsorption onto AKPS. Isotherm data fitted well for both Langmuir and Freundlich models. The maximum adsorption capacity, Q_o that obtained from Langmuir isotherm was 7.692 and values of dimensionless separation factor, R_L were 0.7468, 0.5959, 0.3711, 0.2278 and 0.1643 which is favorable and confirms that APKS is favorable uptake of the RR 198 dye. In this study, exponent,n was 1.949 ($1< n< 10$) shows that Freundlich isotherm best-fit the equilibrium data for adsorption of RR 198 dye on activated PKS. This value indicated that the adsorption capacity increases and new adsorption sites appear. However, higher R^2 value are obtained Freundlich model for RR198 adsorption compared to Langmuir model.